

# 1.6

## Using Data to Predict

Curriculum Outcomes	Related Activities	Page in Text
<ul style="list-style-type: none"> <li>create and analyze plots using appropriate technology</li> <li>demonstrate an intuitive understanding of correlation</li> </ul>	<ul style="list-style-type: none"> <li>create scatter plots to display data that represent the relationship between two variables</li> <li>describe patterns in the graphed data</li> <li>determine a line of best fit</li> <li>make predictions, both extrapolating and interpolating, using a line of best fit</li> </ul>	42
<ul style="list-style-type: none"> <li>use interpolation and extrapolation and the equation to predict and solve problems</li> </ul>	<ul style="list-style-type: none"> <li>rate their confidence level in interpolated and extrapolated predictions</li> <li>equations for the line of best fit will be explored in Chapter 4</li> </ul>	42

### Discussion Questions

- How is a scatter plot different from the other graphs you've seen in this chapter?  
 -It displays the relationship between two variables rather than the distribution of one variable.
- How can you tell, from looking at a scatter plot, which is the independent variable? the dependent variable?  
 -the independent variable is always on the x-axis
- Can you think of other relationships that would form a similar scatter plot and line of best fit to the one in the Focus (Pg.40,41)?  
 -(Positive relationship)  
 -Example: The relationship between study time and test mark. The test mark increases when there is more time spent studying.

# Scatter Plot

- Displays ordered pairs by using coordinates
- The independent variable is plotted on the horizontal axis
- The dependant variable is plotted on the vertical axis
- Points on the scatter plot often show a relationship, or pattern that can be identified

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### Line of best fit

- Drawn on a scatter plot
- Can be used to show the relationship between the two variables
- The line is not drawn between any particular points
- It is drawn through, or close to, as many points as possible

### Relationships

- The arrangement of the points on the scatter plot and the corresponding line of best fit suggests a cause-and-effect relationship between the two variables.



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## Interpolate

- Make a prediction that falls between given pieces of data

## Extrapolate

- Make a prediction that is outside the range of given values

## Focus Questions Page 41 (completing together)

### Focus L: Answers

#### Question #1:

(a) The line should go through as many points as possible, with as many points above the line as below.

(b) Depends, the tree might go through periods of rapid growth, therefore the growth rate for ages 1 to 8 might be quite different from the rapid growth period.

#### Question #2:

Possible reasons are:

- there may not be a cause-and-effect relationship
- the sample size is too low
- non-linear relationship (a curve)
- there may have been variables that were not controlled.

### Investigation 5: Predicting writing speed

Pg.41

We will do the timed writings of the words together:

We will do each one 11 times, make sure to copy down your times.

1. Print the word RED, completely and correctly, as many times as you can in 15 seconds.



2. Print the word GREEN, completely and correctly, as many times as you can in 15 seconds.



3. Print the word MAGENTA, completely and correctly, as many times as you can in 15 seconds.



4. Print the word TURQUOISE, completely and correctly, as many times as you can in 15 seconds.



5. Print the word ULTRAMARINE, completely and correctly, as many times as you can in 15 seconds.



## Classwork/Homework

Follow the Procedure for Investigation 5

Pg.42

-answer any questions asked in the procedure

-Count up the number of times you wrote each color for each trial.

-Get 4 numbers for each color from another student

-Find the MEDIAN of the 8 numbers for each color

-Write the 5 ordered pairs (x,y) (number of letters in the word, number of times (median))

-Create a scatter plot (on graph paper, label each axis)

-Continue with answering questions on Pg.42 starting at step E.

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Answer the Investigation questions on Page 42

Classwork/Homework

Finish Investigation Pg.42  
(the rest of the page)

and do #6 Pg.43

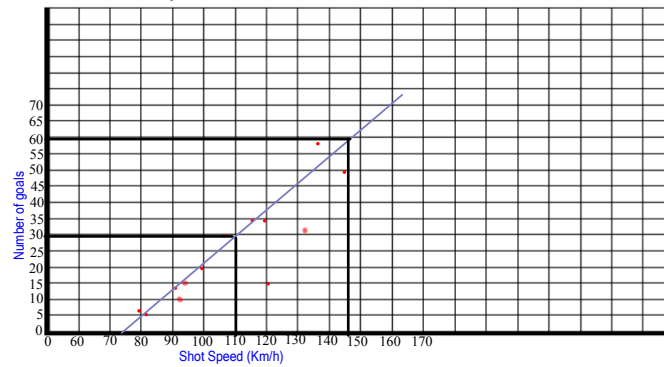
Classwork/Homework

Do Questions Pg.43,44 # 6-10

Students were studying the relationship between slap-shot speed and goals scored in a hockey game. They matched the speeds against the scoring records from the past season for 13 players.

Shot Speed (km/hr)	80	100	93	138	115	82	134	95	145	91	120	108	121
Number of Goals	6	20	10	58	35	5	42	15	50	14	35	30	15

Construct a scatter plot. Draw a line of best fit.



- 1) Predict how many goals a player would score if he/she had a slap-shot speed of 110 km/h. →

25

- 2) A player scores 60 goals in one season. Predict her slap-shot speed in the playoffs →

155 Km/h

- 3) Why would you feel confident about your predictions in questions 1) and 2)? Explain.

The predictions are reasonable since there seems to be a linear relationship between the variables.